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Critical temperature of a ferromagnet/superconductor structures in a parallel magnetic field

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Abstract

Two- and three-layered structures consisting of ferromagnetic metal (F) film and superconductor (S) film are considered in the magnetic field H applied parallel to the plane of the F/S interface. Magnetic-penetration depth is presumed much greater than thicknesses of layers. Assuming that both S and F layers are dirty the boundary problem for the Usadel function is solved taking account of so called "Umklapp processes" for momenta of superconducting pairs on the F/S interface. It is shown that the field H can significantly alter a functional form of the dependence of critical temperature Tc versus thickness of the F layer df. Keeping in mind the possible applications like the superonducting spin-valve the behavior of T c(df) for the F/S/F trilayer in the magnetic field is investigated. © 2009 IOP Publishing Ltd.

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